TPD06 - 00596

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 3RD FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8305 • Fax: (808) 523-4730 • Internet: www.honolulu.gov

MUFI HANNEMANN
MAYOR

MELVIN N. KAKU
DIRECTOR

RICHARD F. TORRES
DEPUTY DIRECTOR

November 27, 2006

MEMORANDUM

TO: TORU HAMAYASU, CHIEF
TRANSPORTATION PLANNING DIVISION

FROM: JAMES BURKE, CHIEF
PUBLIC TRANSIT DIVISION

SUBJECT: HONOLULU HIGH-CAPACITY TRANSIT CORRIDOR PROJECT
ALTERNATIVES ANALYSIS REPORT

We have reviewed the Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Report dated November 1, 2006, that was available at www.honolulutransit.org. Our comments are as follows:

Stations:

a) Leeward Community College: It was difficult to discern this station's exact location. However, a station that is not actually on the campus really does no good. If the station is not on the campus, then the system will be forcing passengers into the same situation as now.
b) We recommend a station near Waipahu High School on Farrington Highway at Waipio Point Access Road.
c) Pearl Highlands: This will not be easily served by buses and does not appear to provide access for the Pearl City area. Why not Waimano Home Road?
d) We like going to the airport, but do not understand the value of a Lagoon Drive Station.
e) We prefer that the Middle Street station be closer to the Middle Street Intermodal Center.
f) We prefer there be a station at the convention center.
g) We note that the stations on University Avenue are closer than the stops on Route A City Express!

Our other comments are listed on Attachment 1 and detailed on the attached paper copy of the report.

Thank you for the opportunity to review and comment on this report.

If you have any questions regarding this, please call me.

JAMES BURKE

Attachments

Attachment 1

Page S-6
Or: Need to change to *of*.

Page 1-5
Why are two high schools in the corridor mentioned and others are not?
Downtown Kapolei's activity centers are not shown; important.

Page 1-9
Daily Transit Trips
Punchbowl-Sheridan-Date – uncommon corridor grouping.
Some explanation for the difference between this # and the one on page 1-12: are they link trips and unlinked? Are there different dates?

Page 1-9
Public Transit System
73 million passengers per year: Only in 2002 per NTD.

Page 1-12
Public Transit System
236,600: How is this number corroborated?

Page 1-14
Average MPH is greater than 13.4.
Average MPH for 2002-2006 according to NTD data is 14.55.

Page 1-15
"Five minutes late 38 percent"
What report is this from?

Page 2-3
Transit Vehicle Requirements
2005 Existing Condition, Bus Peak/Fleet – 409/525: Cite source.

Page 2-3
Alternative 2: Transportation System Management
"conversion of the present a.m. peak-hour-only…": How will this aid congestion?

Page 2-9
Fixed Guideway Alternative Section I
This should be a transit bus rail hub.

Page 2-10
Fixed Guideway Alternative Section II
Not enough access.

Page 2-15
Minimum of 300 passengers: Is this correct?

Page 2-16
Continue elevated
Is this exclusively elevated?

Page 3-2
Year 2030 Daily Compared to Existing Daily Trips
2005 Daily Trips, All Purposes: Source of data?

Page 3-3
Year 2030 Compared to Existing Peak-Period Work Trips
2005 Peak-Period Home-Based Work Trips: Source of data?

Page 3-4
Total Daily Person Trips by Mode
2005 Existing Conditions numbers: Source of data?

Page 3-11
A.M. Peak-hour Transit Travel Times
2005 Existing Conditions, Walk to Transit/Auto Travel Time: How were the travel times determined? Model results?

Page 3-15
Daily Transit Ridership
2005 Existing Conditions numbers: Need to note origin of the numbers.

Page 3-16
Peak Two-hour Transit Ridership
2005 Existing Conditions number: Need to note origin of number.

Page 3-19
Aloha Stadium /Salt Lake Blvd: Numbers in comparison does not match.
Salt Lake Blvd. and Ala *Inoi* Place: Ala *Nioi*?

Page 3-20
Systemwide Daily Travel Statistics by Alternative
2005 Existing Condition numbers: Cite source.

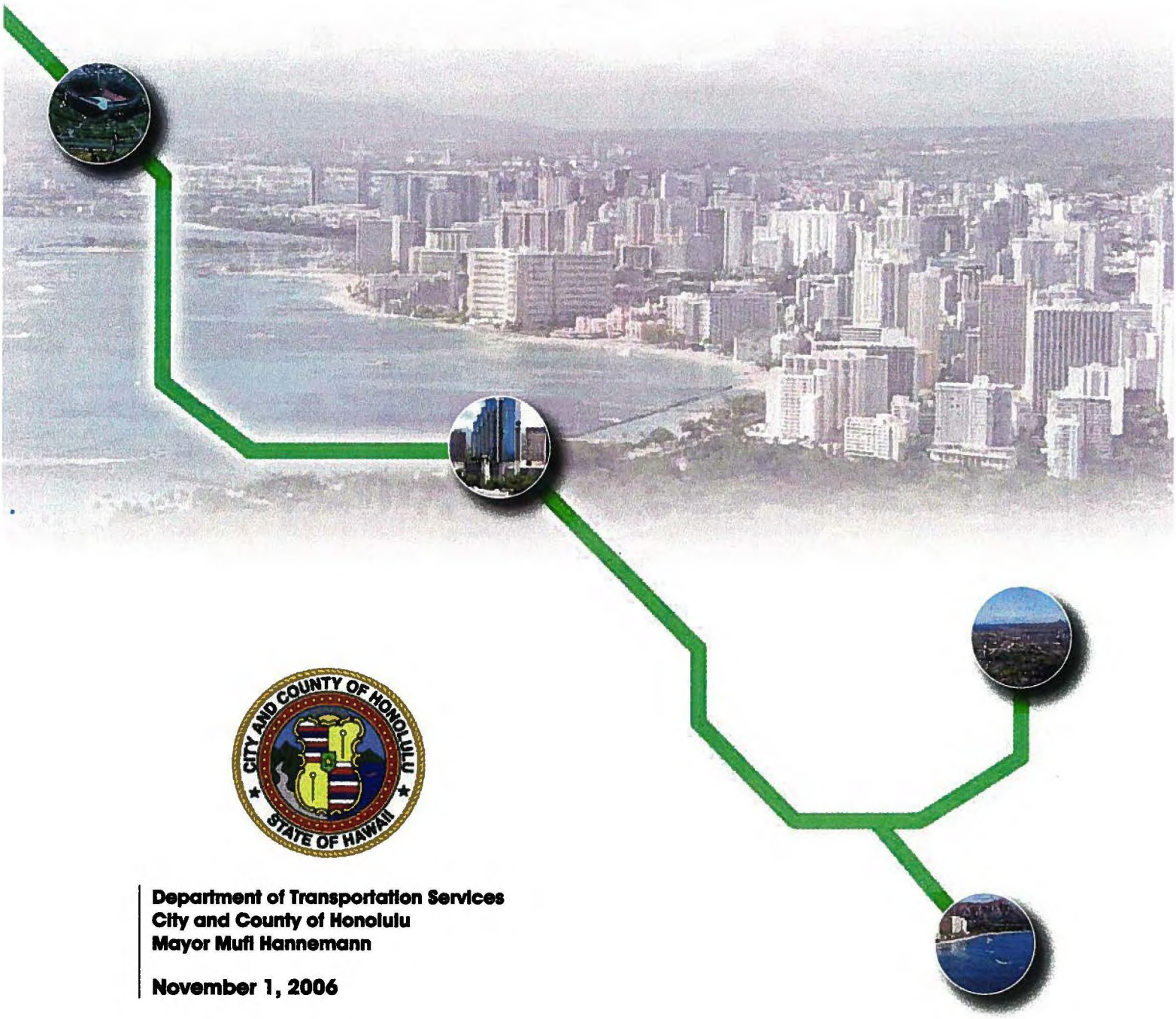
Page 3-23
Selected Screenline Peak-hour Volumes by Alternative
Existing Conditions *2003*: Not *2005*?

Page 4-1

Alternative 3
"47 parcels with commercial/office…":
Number does not match table 4-1.

Page 4-2
Numbers of Parcels Affected, Alternative 3: Number does not match.

Honolulu High-Capacity Transit Corridor Project
Alternatives Analysis Report



Department of Transportation Services
City and County of Honolulu
Mayor Mufi Hannemann

November 1, 2006

Preface

Context of the Alternatives Analysis

This Alternatives Analysis (AA) supports the selection of a locally preferred transit alternative for the City and County of Honolulu consistent with the planning and project development process defined by the Federal Transit Administration (FTA). The first step of the process was systems planning, which culminated with the O'ahu Metropolitan Planning Organization (OMPO) including a fixed guideway transit system in the *2030 O'ahu Regional Transportation Plan* (OMPO, 2006a). This phase, Alternatives Analysis, evaluates a range of transit mode and general alignment alternatives in terms of their costs, benefits and impacts.

The Honolulu City Council will select a locally preferred alternative (LPA) based on the findings of this AA report. Subsequently, design options within the LPA will be evaluated and an Environmental Impact Statement (EIS) will be prepared according to the National Environmental Policy Act (NEPA) as part of the Preliminary Engineering phase. Final Design, construction, and operation of the LPA will follow.

Purpose of the Alternatives Analysis Report

The purpose of this report is to provide the Honolulu City Council with the information necessary to select a mode and general alignment alternative for high-capacity transit service on O'ahu. The primary project study area is the travel corridor between Kapolei and the University of Hawai'i at Mānoa. The report summarizes the results of an AA that followed FTA planning guidance and provides information on the costs, benefits, and impacts of four alternatives:

- No Build Alternative
- Transportation System Management Alternative
- Managed Lane Alternative
- Fixed Guideway Alternative.

The goal of the AA process is to reach a broad consensus regarding which alternative best meets the goals and objectives for the study corridor. The analysis in the AA is defined by the need to make an intelligent selection of a preferred mode and general alignment. After public release of this report, the City Council will conduct public hearings to solicit community views on the evaluated alternatives. Considering both the technical information provided in the AA and the comments from the public, the Council will select an LPA to provide improved transit service in the study corridor. After selection of the LPA, the City and County of Honolulu Department of Transportation Services (DTS) will apply to FTA to begin Preliminary Engineering.

Organization of the Alternatives Analysis Report

This report is organized into a summary followed by seven chapters. Chapter 1 provides the context for the study, including a description of the corridor and the existing transportation system, planned growth and improvements in the corridor, the need for an improved transit system, and a definition of the purpose of the alternatives evaluated. Chapter 2 describes the alternatives being evaluated and how they were selected through both technical review and public comment.

Chapters 3 through 5 evaluate the technical merits and consequences of the alternatives. Chapter 3 presents the effects that the alternatives would have on the transportation system. The physical and social environment that would be affected by the alternatives and the effects on that environment are described in Chapter 4. Chapter 5 presents the financial evaluation of the alternatives, including their costs and how their implementation and long-term operation would be funded.

Chapter 6 summarizes all of the technical findings and describes how each alternative would meet the goals and objectives established for the project. It also compares the trade-offs among the alternatives. The final chapter, Chapter 7, describes the public involvement and agency coordination that has been conducted to include the concerns of affected parties in the planning process.

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Acronyms Used in this Document

AA	Alternatives Analysis
DTS	Department of Transportation Services
EIS	Environmental Impact Statement
FGM	Fixed Guideway Modernization
FTA	Federal Transit Administration
FY	Fiscal Year
GET	General Excise and Use Tax
GO	General Obligation
HDOT	Hawai'i Department of Transportation
HOV	High Occupancy Vehicle
LOS	Level-of-Service
LPA	Locally Preferred Alternative
NEPA	National Environmental Policy Act
O&M	Operation and Maintenance
OMPO	O'ahu Metropolitan Planning Organization
ORTP	O'ahu Regional Transportation Plan
OTS	O'ahu Transit Services, Inc.
PE	Preliminary Engineering
PUC	Primary Urban Center
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act
SCC	Standard Cost Categories
TSM	Transportation System Management
UH	University of Hawai'i
USC	United States Code
V/C	Volume-to-Capacity Ratio
VHD	Vehicle Hours of Delay
YOE	Year of Expenditure

The City and County of Honolulu Department of Transportation Services (DTS), in coordination with the U.S. Department of Transportation Federal Transit Administration (FTA), has carried out an Alternatives Analysis (AA) to evaluate alternatives that would provide high-capacity transit service on O'ahu. The primary project study area is the travel corridor between Kapolei and the University of Hawai'i at Mānoa (UH Mānoa) (Figure S-1). This corridor includes the majority of housing and employment on O'ahu. The east-west length of the corridor is approximately 23 miles. The north-south width of the corridor is at most four miles, as much of the corridor is bounded by the Ko'olau and Wai'anae Mountain Ranges to the north and the Pacific Ocean to the south.

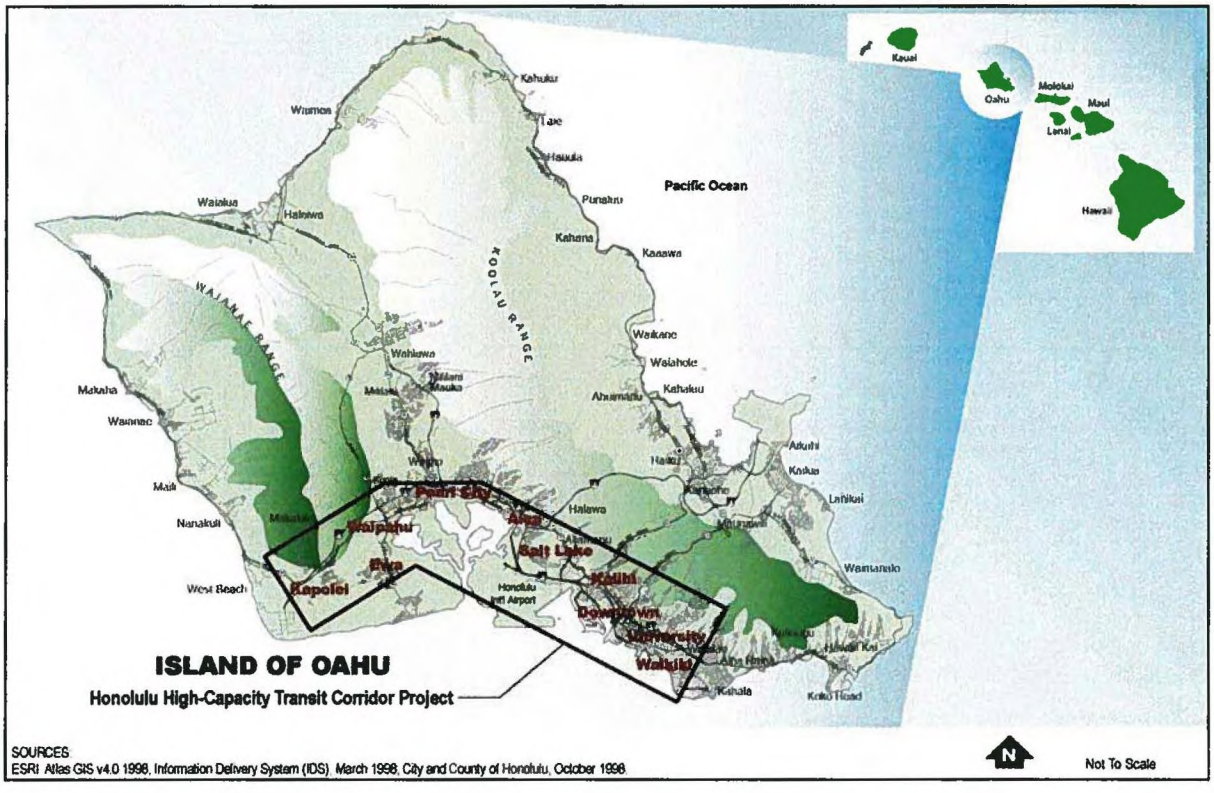


Figure S-1. Project Vicinity

Purpose of and Need for Transportation Improvements

The purpose of the Honolulu High-Capacity Transit Corridor Project is to provide improved mobility for persons traveling in the highly congested east-west transportation corridor between Kapolei and UH Mānoa. System planning for the corridor culminated in the *2030 O'ahu Regional Transportation Plan* (OMPO, 2006a).

The O'ahu Metropolitan Planning Organization (OMPO) concluded that the existing transportation infrastructure in this corridor is overburdened handling current levels of

travel demand. Motorists experience substantial traffic congestion and delay at most times of the day during both the weekdays and weekends. Currently, transit is caught in the same congestion. As roadways become more congested, they become more susceptible to substantial delays caused by incidents such as traffic accidents or heavy rain. Current travel times are not reliable for either transit or automobile trips.

The highest population growth rates for the island, consistent with the General Plan for the City and County of Honolulu, are projected in the 'Ewa Development Plan area. Many lower-income and minority workers live in the corridor outside of the urban core and commute to work in the Primary Urban Center Development Plan area. Many lower-income workers also rely on transit because of its affordability.

Alternatives Considered

Four alternatives are evaluated in this report. They were developed through a screening process that considered alternatives identified through previous transit studies, a field review of the study corridor, an analysis of current population and employment data for the corridor, a literature review of technology modes, work completed by the O'ahu Metropolitan Planning Organization (OMPO) for its *2030 O'ahu Regional Transportation Plan (OMPO, 2006a),* and public and agency comments received during a formal project scoping process. The four alternatives are described in detail in the *Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Detailed Definition of Alternatives (DTS, 2006a).* The alternatives evaluated are as follows:

- No Build Alternative
- Transportation System Management Alternative
- Managed Lane Alternative
- Fixed Guideway Alternative.

Two operational options were studied for the Managed Lane Alternative. Several alignments were studied for the Fixed Guideway Alternative, including a shorter 20-mile Alignment.

Transportation Impacts and Benefits

In the year 2030, the only alternative that is expected to significantly affect transit mode share and attract additional transit riders is the Fixed Guideway Alternative. Many Fixed Guideway alignment options were evaluated and the Kalaeloa - Airport - Dillingham - Halekauwila alignment combination is projected to attract the highest number of daily transit trips systemwide.

In regards to serving existing and future transit markets, the Fixed Guideway Alternative does the best job in accommodating both longer corridor transit trips, as well as the increase in work commute trips to West O'ahu, which is expected to become much more pronounced in the future. Two operational concepts for the Managed Lane Alternative were evaluated, and the Two-direction Option best serves the increase in work commute trips to West O'ahu.

The Fixed Guideway Alternative most consistently results in improved transit travel times between key corridor origins and destinations. In many cases these travel times are equivalent to, or faster than, the same trip time made by private vehicle under No Build conditions, especially when considering the use of park-and-ride trips. The Fixed Guideway Alternative would produce the most reliable travel times because the vehicles would operate in their own right-of-way separate from roadways and associated congestion. The Managed Lane Alternative would provide some travel time improvements between selected origins and destinations that are well served by the facility, but in many cases the travel time savings experienced is offset by the increased congestion experienced before entering and upon exiting the facility.

Traffic congestion on key corridor facilities is expected to continue to exist under all alternatives, particularly during peak travel periods. Systemwide vehicle hours of delay (VHD) are projected to be substantially lower for the Fixed Guideway Alternative as compared to all other alternatives. While all other alternatives have a minimal to negligible impact on peak-period traffic volumes in the corridor (in fact, the Managed Lane options are expected to increase vehicle peak-hour volumes in the corridor), the Fixed Guideway Alternative is projected to reduce peak traffic volumes that cross Kalauao Stream and Kapālama Canal by three to 12 percent. Most importantly, however, the Fixed Guideway Alternative would provide a mobility option that the other alternatives do not. It gives users the opportunity to bypass the congestion that will occur on roadways throughout the study corridor.

Environmental Impacts and Benefits

The No Build and TSM Alternatives would generate minimal environmental impacts; however, they also would not generate environmental benefits.

The Managed Lane Alternative would require a moderate number of displacements and would affect a moderate number of potentially historic structures and one recreational facility. It would generate the greatest amount of air pollution, require the greatest amount of energy for transportation use, and would result in the largest number of transportation noise impacts. It would provide little community benefit, as it would not provide substantially improved transit access to the corridor.

Compared to the other alternatives, the Fixed Guideway Alternative would require more acquisitions and affect more potentially historic structures, as well as three park or recreational facilities. It would result in fewer transportation noise impacts than the Managed Lane Alternative.

Visual impacts for the Fixed Guideway Alternative would be less than those for the Managed Lane Alternative in areas where both alternatives would include structures, but the Fixed Guideway Alternative would extend beyond the area of the Managed Lane Alternative. The visual impacts of the 20-mile Alignment would be less than that for the 28-mile Full-corridor Alignment because the area of effect would be less.

The Fixed Guideway Alternative would generate the least air pollution and require the least energy for transportation. It would provide improved connections between communities, employment, and services in the corridor. The benefits of the Full-corridor Alignment would be somewhat greater than those for the 20-mile Alignment.

Financial Feasibility

Capital Costs

Capital costs for the No Build and TSM Alternatives would be $660 and $856 million, respectively, which accounts for bus replacement and system expansion. Total capital costs for the Managed Lane Alternative would range between $3.6 and $4.7 billion, of which $2.6 to $3.8 billion would be for construction of the managed lanes. Capital costs for the Fixed Guideway Alternative, including bus system costs, would range between $5.2 and $6.1 billion for the Full-corridor Alignments, of which $4.6 to $5.5 billion would be for the fixed guideway system. The costs would be $4.2 billion for the 20-mile Alignment, of which $3.6 billion would be for the fixed guideway system.

Operating and Maintenance Costs

Operating costs in 2030 for the No Build Alternative, in 2006 dollars, would be approximately $192 million. Operating costs for the TSM Alternative would be approximately $42 million greater than for the No Build Alternative. Transit operating costs for the Managed Lane Alternative would range between approximately $251 and $261 million as a result of additional buses that would be put in service under that alternative. These costs do not include the cost of maintaining the managed lane facility. The total operating costs for the Fixed Guideway Alternative, including the bus and fixed guideway, would range between approximately $248 and $256 million.

Funding Options

Funding sources for capital investments include a State General Excise and Use Tax (GET) surcharge, City general obligation bonds, and FTA funds. Only the Fixed Guideway Alternative could be funded with the GET surcharge. The No Build and TSM Alternatives are a continuation of existing bus services and system costs reflect ongoing operations with current funding sources.

With the Managed Lane Alternative, toll revenues would pay for ongoing operation and maintenance; remaining revenues would be used to contribute to repaying debt incurred to construct the system. Projections identify a funding deficit of $2.3 billion in 2006 dollars. Other funding sources would need to be identified to provide the remaining funding. Toll revenues would pay for less than one-quarter of debt service; other city funds would be needed for the remaining three-quarters.

For the Fixed Guideway Alternative, the GET surcharge is expected to yield between $2.6 and $3.2 billion in 2006 dollars. The 20-mile Alignment would require between $0.7 and $1.2 billion in 2006 dollars in funds from FTA New Starts or other sources. The Full-corridor Alignment would require between $1.7 and $2.2 billion in 2006 dollars in funds from FTA New Starts or other sources.

Evaluation of Alternatives

The alternatives were compared regarding their ability to improve corridor mobility, support smart growth and economic development, provide a cost-effective and equitable transportation solution, be constructible, minimize community and environmental impacts, and be consistent with other planning efforts.

The relative merits of two operational options were evaluated for the Managed Lane Alternative, and one was determined to be more effective than the other. Similarly, the Fixed Guideway Alternatives were evaluated and an optimal option of the alignments was selected. Because the performance differences between the two Managed Lane options would be small, the less costly Reversible Option would offer a better benefit-to-cost ratio; therefore, it would be the best option for the Managed Lane Alternative. The Kalaeloa - Airport - Dillingham - Halekauwila combination is the optimal Fixed Guideway alignment for the entire corridor. A 20-mile portion of that alignment from East Kapolei to Ala Moana Center provides a lower-cost option within the Fixed Guideway Alternative.

The Fixed Guideway Alternative performs the best when considering the goal of improving corridor mobility. The Full-corridor Alignment provides greater transportation benefits than the 20-mile Alignment. Although less effective than the full-corridor system, the 20-mile Alignment is still more effective at providing improved mobility than any of the other three alternatives.

In relation to encouraging patterns of smart growth and economic development, the No Build, TSM, and Managed Lane Alternatives generally maintain existing transit service patterns and methods. None of these alternatives would provide a high level of transit service that would serve as a nucleus for transit-oriented development. The Fixed Guideway Alternative would include new stations providing reliable high-capacity transit at locations zoned for new development or suitable for redevelopment. The Full-corridor Alignment would provide the greatest opportunity for smart growth, but considerable opportunities also would occur with the 20-mile Alignment.

The Fixed Guideway Alternative is substantially more cost-effective than the Managed Lane Alternative when the respective transit user benefits per dollar of cost relative to the TSM Alternative are compared.

The Fixed Guideway Alternative best meets the goal of providing equitable solutions. The Full-corridor Alignment would best serve transit-dependent populations, but the 20-mile Alignment would serve the majority of those served by the Full-corridor Alignment.

The No Build and Fixed Guideway Alternatives are financially feasible considering reasonably certain funding sources. The No Build Alternative would continue bus service using existing funding sources. The TSM Alternative would require a limited amount of additional funds, which could be from existing funding sources. Because the implementing legislation prohibits the GET surcharge from being used to fund existing transit systems, it would not be available to fund the TSM Alternative. The Managed

Lane Alternative has no defined funding source. Because it would be open to general purpose vehicles, including single-occupancy vehicles (cars carrying only the driver), neither the GET surcharge nor FTA funds could be used for its construction. The 20-mile Alignment for the Fixed Guideway Alternative could be funded with a combination of expected GET revenues and FTA New Starts funds. There is more uncertainty in funding of the Full-corridor Alignment. Either a larger share of FTA funds would be needed or other sources would need to be tapped.

The alternatives range widely in relation to community and environmental impacts. The No Build and TSM Alternatives would have little direct effect on existing resources; however, they also would not offer community or environmental benefits. The Managed Lane Alternative would require acquisition of private property, generate the highest levels of air and water pollution, consume the greatest amount of energy for transportation uses, and create the greatest number of noise impacts. The Fixed Guideway Alternative would require the greatest number of property acquisitions and have the greatest number of utility conflicts during construction, but it would also provide a new safe transportation connection between communities in the corridor. It would provide the greatest environmental benefits related to air and water pollution and energy consumption.

All alternatives are generally consistent with Local, District, and State plans. The Fixed Guideway Alternative best serves the areas of O'ahu that are designated for future growth and development. The Fixed Guideway Alternative is the only alternative that is consistent with regional transportation system planning defined in the *2030 O'ahu Regional Transportation Plan* (OMPO, 2006a).

Residents' Alternatives Preferences

The residents of Honolulu are very concerned about transportation. In the *Honolulu Advertiser* Hawai'i Poll conducted in June 2006, traffic was identified by most respondents as the most important issue currently facing Hawai'i (*Honolulu Advertiser*, 2006). While preparing the *2030 O'ahu Regional Transportation Plan*, OMPO conducted a telephone survey of O'ahu residents to gauge public reaction to transportation solutions (OMPO, 2006b). More than 50 percent of the respondents said that they would use rapid transit regularly or occasionally.

Scoping conducted for the Honolulu High-Capacity Transit Corridor Project also indicated broad interest and a majority of support for transportation improvements in the corridor. The majority of comments received during scoping related to a preference for one of the alternatives or a proposed modification to one of the alternatives. As a result of public comments, moderating the growth in traffic congestion was added to the purpose and need, a second Managed Lane option was added, and the presentation of the Fixed Guideway Alternative was changed. There continues to be both organized support for and opposition to the Managed Lane and Fixed Guideway Alternatives.

The tunnel crossing of Pearl Harbor was rejected because it would not provide an alternative to private automobile use or improve linkages within the study corridor, as it would bypass much of the corridor and not provide any new connections within the remainder of the corridor.

Waterborne ferry service was eliminated as a primary transit system because its capacity and travel times were not competitive with other alternatives. This alternative is being studied as an augmentation to the existing transit system in a separate effort from this project.

Several transit technologies were eliminated for various reasons. Diesel multiple unit was eliminated based on technical maturity, supplier competition, and environmental performance. Personal rapid transit was eliminated based on lack of technical maturity and line capacity. Commuter rail was eliminated because it is not suited for short station spacing and is not competitive without existing freight tracks being available. Also, emerging rail concepts were eliminated because of their lack of technical maturity and the rapid implementation schedule for the project.

For the Fixed Guideway Alternative screening analysis, the corridor was divided into eight sections. (Following the screening analysis, the eight sections were combined into a set of five sections.) Within each of the sections, the alignments that demonstrated the best performance related to mobility and accessibility, supporting smart growth and economic development, constructability and cost, community and environmental quality, and planning consistency were retained for evaluation in the AA.

Alternatives Evaluated in this Alternatives Analysis

Four alternatives are evaluated in this AA report. They were developed through a screening process that considered alternatives identified through previous transit studies, a field review of the study corridor, an analysis of current population and employment data for the corridor, a literature review of technology modes, work completed by the O'ahu Metropolitan Planning Organization (OMPO) for its *2030 O'ahu Regional Transportation Plan* (OMPO, 2006a), and public and agency comments received during a formal project scoping process held that would satisfy the requirements of the National Environmental Policy Act (NEPA) and the Hawai'i EIS Law (Chapter 343). The four alternatives are described in detail in the *Honolulu High-Capacity Transit Corridor Project Alternatives Analysis Detailed Definition of Alternatives* (DTS, 2006a). The alternatives evaluated are as follows:

- No Build Alternative
- Transportation System Management Alternative
- Managed Lane Alternative
- Fixed Guideway Alternative.

Alternative 1: No Build

The No Build Alternative includes existing transit and highway facilities and committed transportation projects anticipated to be operational by 2030. Committed transportation

projects are those programmed in the *2030 O'ahu Regional Transportation Plan* prepared by OMPO. The committed highway elements of the No Build Alternative are also included in the build alternatives.

The No Build Alternative's transit component would include an increase in fleet size to accommodate the anticipated growth in population, while allowing service frequencies to remain the same as today. Bus fleet requirements are listed in Table 2-1.

Table 2-1. Transit Vehicle Requirements

Alternative	Bus		Fixed Guideway	
	Peak	Fleet	Peak	Fleet
2005 Existing Conditions				
Existing Conditions	409	525	0	0
Alternative 1: 2030 No Build				
No Build Alternative	511	614	0	0
Alternative 2: 2030 Transportation System Management				
TSM Alternative	638	765	0	0
Alternative 3: 2030 Managed Lane				
Two-Direction Option	705	846	0	0
Reversible Option	755	906	0	0
Alternative 4: 2030 Fixed Guideway				
Kalaeloa - Salt Lake - North King - Hotel	441	529	72	90
Kamokila - Airport - Dillingham - King with a Waikīkī Branch	435	525	68	90
Kalaeloa - Airport - Dillingham - Halekauwila	448	540	74	90
20-mile Alignment East Kapolei to Ala Moana Center	497	596	54	70

CITE SOURCES

Alternative 2: Transportation System Management

The Transportation System Management (TSM) Alternative would provide an enhanced bus system based on a hub-and-spoke route network, conversion of the present a.m. peak-hour-only zipper-lane to both a morning and afternoon peak-hour zipper-lane operation, and relatively low-cost capital improvements on selected roadway facilities to give priority to buses. Bus fleet requirements are listed in Table 2-1. The TSM Alternative includes the same committed highway projects as assumed for the No Build Alternative.

HOW WILL THIS AID CONGESTION

Alternative 3: Managed Lane

The Managed Lane Alternative would include construction of a two-lane, grade-separated facility between Waipahu and Downtown Honolulu (Figure 2-1 and Figure 2-2) for use by buses, paratransit vehicles, and vanpool vehicles. The managed lane facility would integrate with HDOT's proposed Nimitz Flyover project that is included in the *2030 O'ahu Regional Transportation Plan* (OMPO, 2006a). HOV and toll-paying, single-occupant vehicles also would be allowed to use the facility provided that sufficient capacity would be available to maintain free-flow speeds for buses and the above-noted paratransit and vanpool vehicles. Variable pricing strategies for single-occupant vehicles would be implemented to maintain free-flow speeds for transit and HOVs. Two design

and operational variations of the Managed Lane Alternative are evaluated: a Two-direction Option (one lane in each direction) and a two-lane Reversible Option. For both options, access to the facility in West O'ahu would be via ramps from the H-1 and H-2 Freeways just prior to the Waiawa Interchange. Both options would require modification to the Nimitz Flyover project's design and would terminate with ramps tying into Nimitz Highway at Pacific Street. The H-1 zipper lane would be maintained in the Two-direction Option but discontinued in the Reversible Option.

An intermediate bus access point would be provided in the vicinity of Aloha Stadium. Bus service using the managed lane facility would be restructured and enhanced, providing additional service between Kapolei and other points 'Ewa of the Primary Urban Center, and Downtown Honolulu and UH Mānoa.

Characteristics of the Managed Lane Alternative

The Two-direction Option would serve express buses operating in both directions during the entire day. The Reversible Option would serve peak-direction bus service, while reverse-direction service would use H-1. Twenty-nine bus routes, with approximately 93 buses per hour, would use the managed lane facility during peak hours for either option. One limited-stop route and one local route would continually operate in the managed lane. A total of 27 peak-period express routes would operate in the peak direction using the managed lane facility. Of these, three are new express routes serving developing areas and nine are new routes developed for exclusive use of the managed lane. The nine new managed lane express bus system routes originate from Kalaeloa, Kapolei, or Central O'ahu and terminate at the Alapa'i Transit Center, Waikīkī, or UH Mānoa. Other peak-period, local and limited-stop routes follow a route similar to the current structure but will use the managed lane for the line-haul portion of the route.

A toll structure has been developed that ensures that the managed lane facility would operate to maintain free-flow speeds for buses. To maintain free-flow speeds in the Two-direction Option, it may be necessary to charge tolls to manage the number of HOVs using the facility. For the Reversible Option, three-person HOVs would be allowed to use the facility for free, while single-occupant and two-person HOVs would have to pay a toll.

Optimum Managed Lane Option

The two Managed Lane options discussed above are evaluated in the following chapters of this report in relation to transportation benefits, environmental and social consequences, and costs. The findings within each of these topics are synthesized at the beginning of Chapter 6 (Comparison of Alternatives) where it is determined that the Reversible Option is optimal.

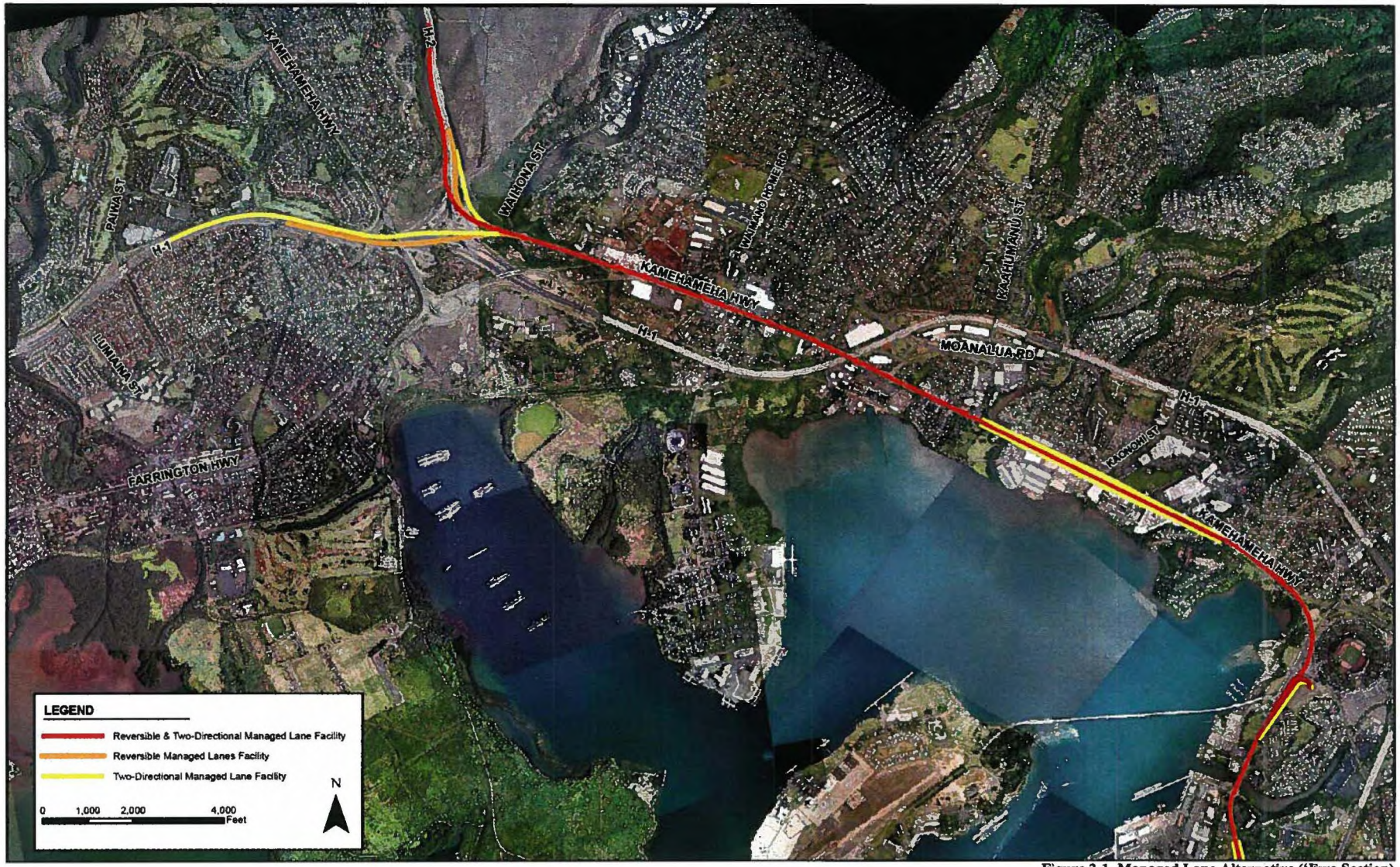


Figure 2-1. Managed Lane Alternative ('Ewa Section)

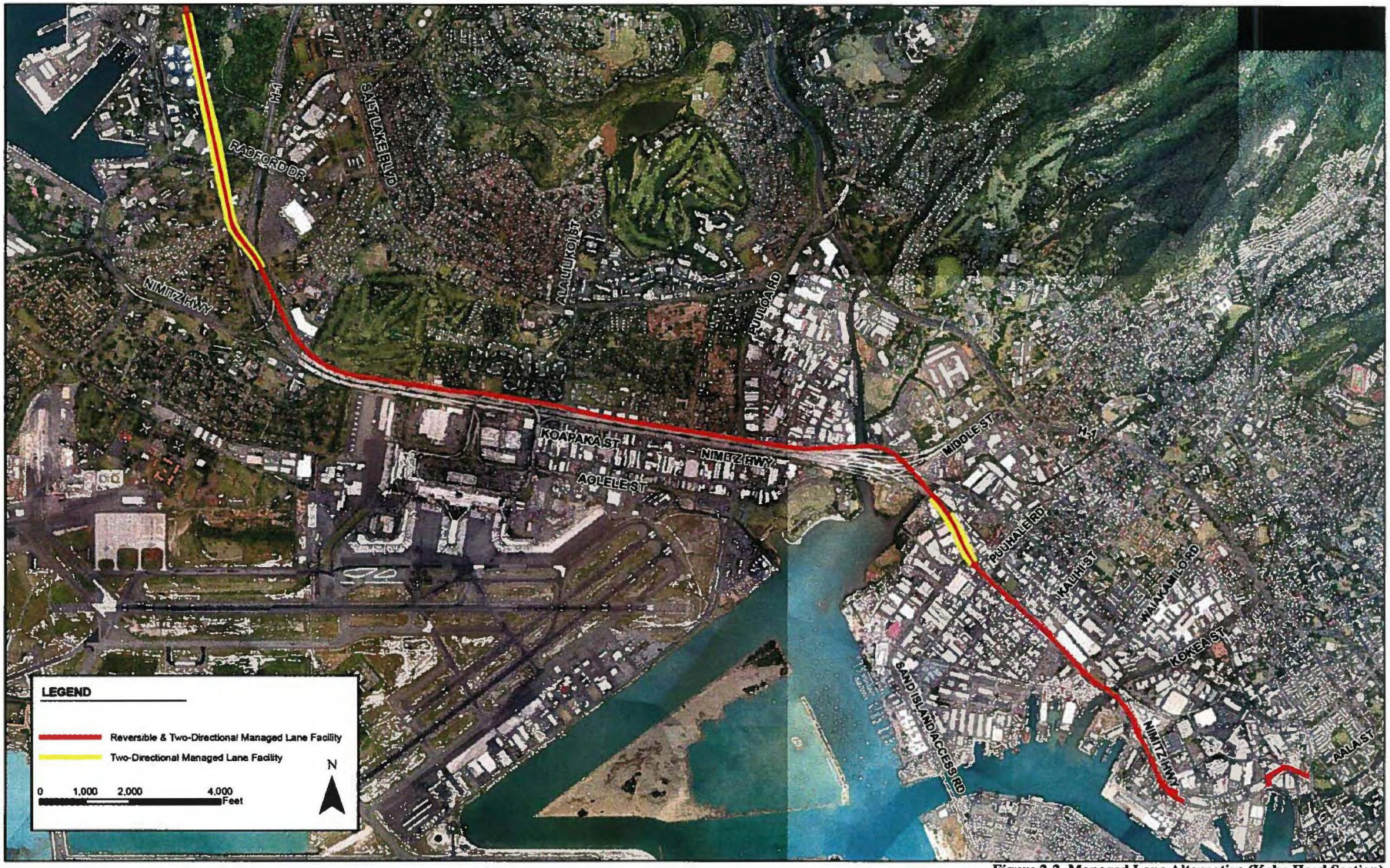


Figure 2-2. Managed Lane Alternative (Koko Head Section)

Alternative 4: Fixed Guideway Alternative

The Fixed Guideway Alternative would include the construction and operation of a fixed-guideway transit system between Kapolei and UH Mānoa. The system could use any of a range of fixed-guideway transit technologies that meet performance requirements and could be either automated or employ drivers.

The study corridor for the Fixed Guideway Alternative is evaluated in five sections to simplify the analysis and facilitate evaluation in this report (Figure 2-3 through Figure 2-7). Detailed alignment drawings are available in the *Honolulu High-Capacity Transit Corridor Project Alignment Plans and Profiles* (DTS, 2006e). Each alignment has distinctive characteristics and environmental impacts, as well as providing different service options. Therefore, each alignment is evaluated individually and compared to the other alignments in that section. The sections, the alignments within each section, and the number of stations considered for each alignment are listed in Table 2-2.

Station and supporting facility locations also are considered. Supporting facilities include a vehicle maintenance facility and park-and-ride lots. Some bus service would be reconfigured to bring riders on local buses to nearby fixed-guideway transit stations. To support this system, the bus fleet would increase or remain as today, as shown in Table 2-1.

Although this alternative would be designed to be within existing street or highway rights-of-way as much as possible, property acquisition at various locations would be required. Future extensions of the system to Central O'ahu, East Honolulu, or within the corridor are possible, but are not being addressed in detail in this AA.

Combination of Fixed Guideway Alternative Alignment Options

For ease of comparison to Alternatives 1 through 3, three alignment combinations are presented in this report. The combinations were selected considering initial information about performance of the various alignment options in each of the corridor sections. While the presented combinations include the alignments with the best performance characteristics in each section, they do not preclude a different combination of alignments from being selected. The three combinations presented are as follows:

- Kalaeloa - Salt Lake - North King - Hotel. This combination would link the following series of alignments through the study corridor: Saratoga Avenue/North-South Road to Farrington Highway/Kamehameha Highway to Salt Lake Boulevard to North King Street to Hotel Street/Kawaiaha'o Street/Kapi'olani Boulevard.
- Kamokila -- Airport - Dillingham - King with a Waikīkī Branch. This combination would link the following series of alignments through the study corridor: Kamokila Boulevard/Farrington Highway to Farrington Highway/Kamehameha Highway to Aolele Street to Dillingham Boulevard to King Street/Waimanu Street/Kapi'olani Boulevard with a Waikīkī Branch.
- Kalaeloa - Airport - Dillingham - Halekauwila. This combination would link the following series of alignments through the study corridor: Saratoga Avenue/North-South

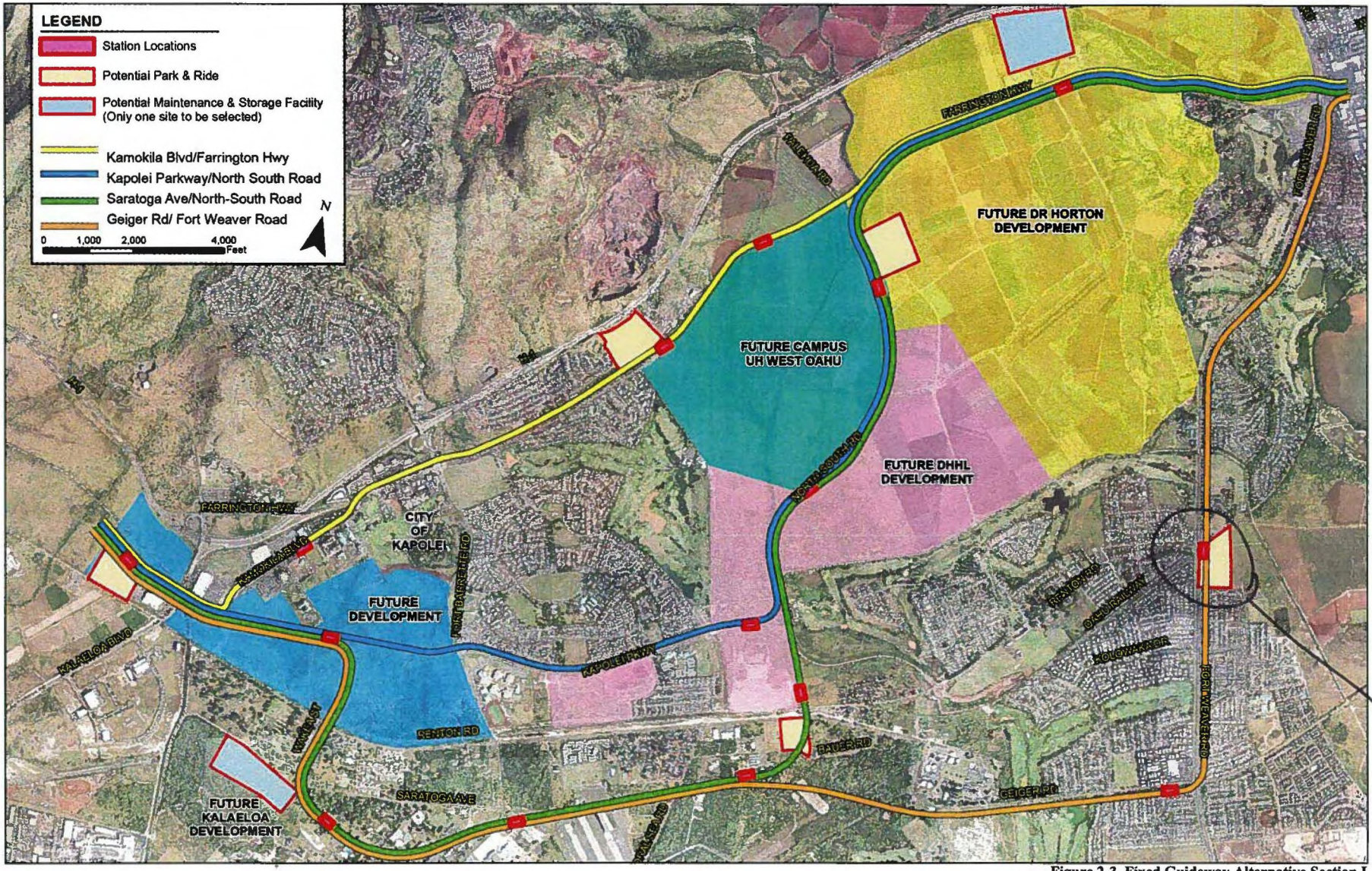
Road to Farrington Highway/Kamehameha Highway to Aolele Street to Dillingham Boulevard to Nimitz Highway/Halekauwila Street/Kapi'olani Boulevard.

Table 2-2. Fixed Guideway Alternative Analysis Sections and Alignments

Section	Alignments Being Considered	Number of Stations
I. Kapolei to Fort Weaver Road	Kamokila Boulevard/Farrington Highway	5
	Kapolei Parkway/North-South Road	6
	Saratoga Avenue/North-South Road	9
	Geiger Road/Fort Weaver Road	7
II. Fort Weaver Road to Aloha Stadium	Farrington Highway/Kamehameha Highway	5
III. Aloha Stadium to Middle Street	Salt Lake Boulevard	2
	Mauka of the Airport Viaduct	3
	Makai of the Airport Viaduct	4
	Aolele Street	4
IV. Middle Street to Iwilei	North King Street	3
	Dillingham Boulevard	4
V. Iwilei to UH Mānoa	Beretania Street/South King Street	7
	Hotel Street/Kawaiaha'o Street/Kapi'olani Boulevard	11
	King Street/Waimanu Street/Kapi'olani Boulevard	7
	Nimitz Highway/Queen Street/Kapi'olani Boulevard	9
	Nimitz Highway/Halekauwila Street/ Kapi'olani Boulevard	9
	Waikīkī Branch	3

Characteristics of the Fixed Guideway Alternative

The fixed guideway system is planned to operate between 4 a.m. and midnight, with a train arriving in each direction at each station between every three and six minutes (Table 2-3). The system is planned to operate with a unified fare structure with TheBus, with transfers and passes usable on both systems. A possible fare-collection system would include one that operates on an honor basis. No gates or fare inspection points would be used in the stations. Fare machines would be available at all stations and standard fare boxes would be used on buses. Fare inspectors would ride the system and check that passengers have valid tickets or transfers. Violators would be cited and fined.



THIS SHOULD BE A TRANSIT BUS/RAIL HUB

Figure 2-3. Fixed Guideway Alternative Section I

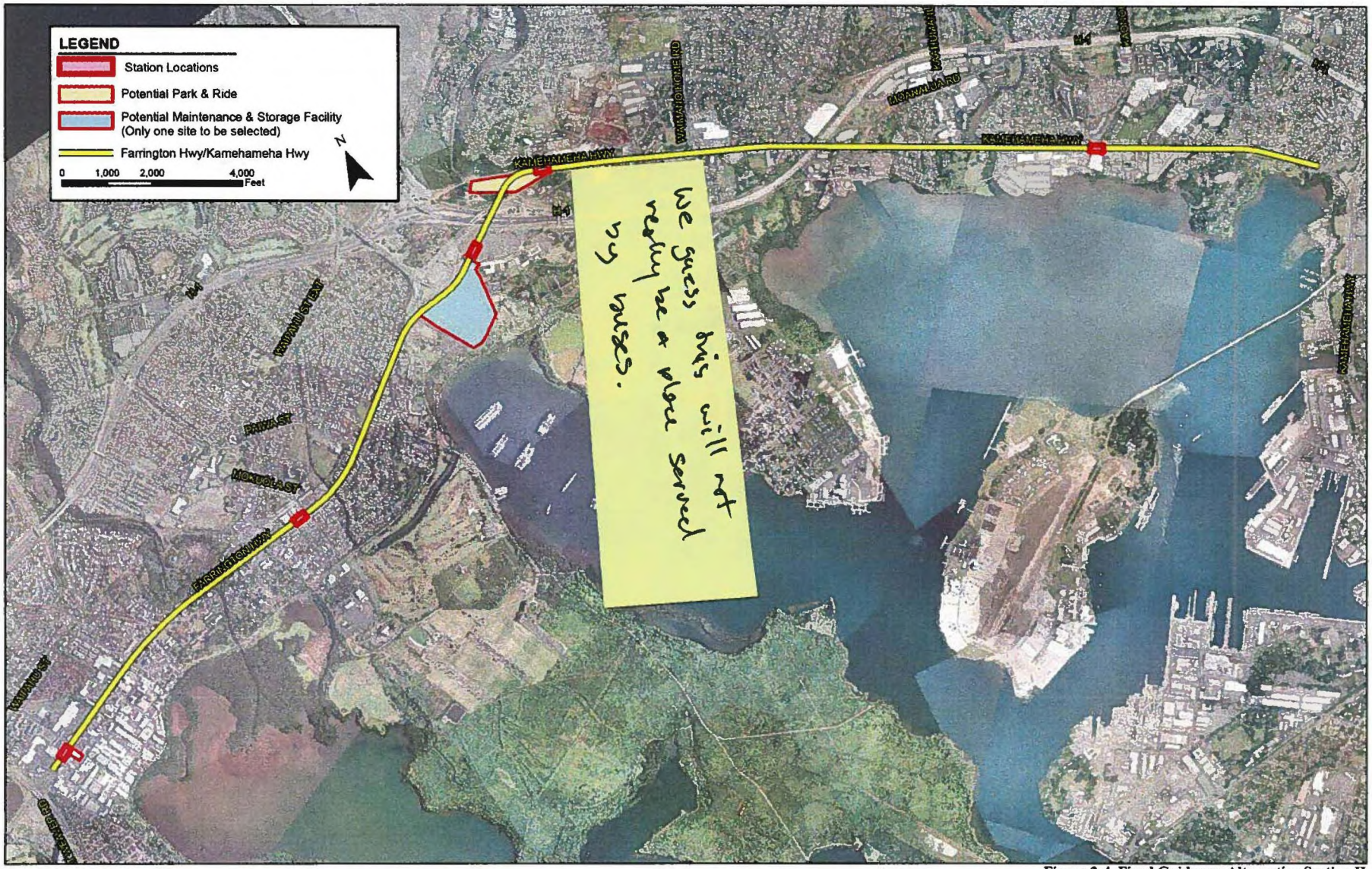


Figure 2-4. Fixed Guideway Alternative Section II

NOT ~~ENOUGH~~ ENOUGH ACCESS?

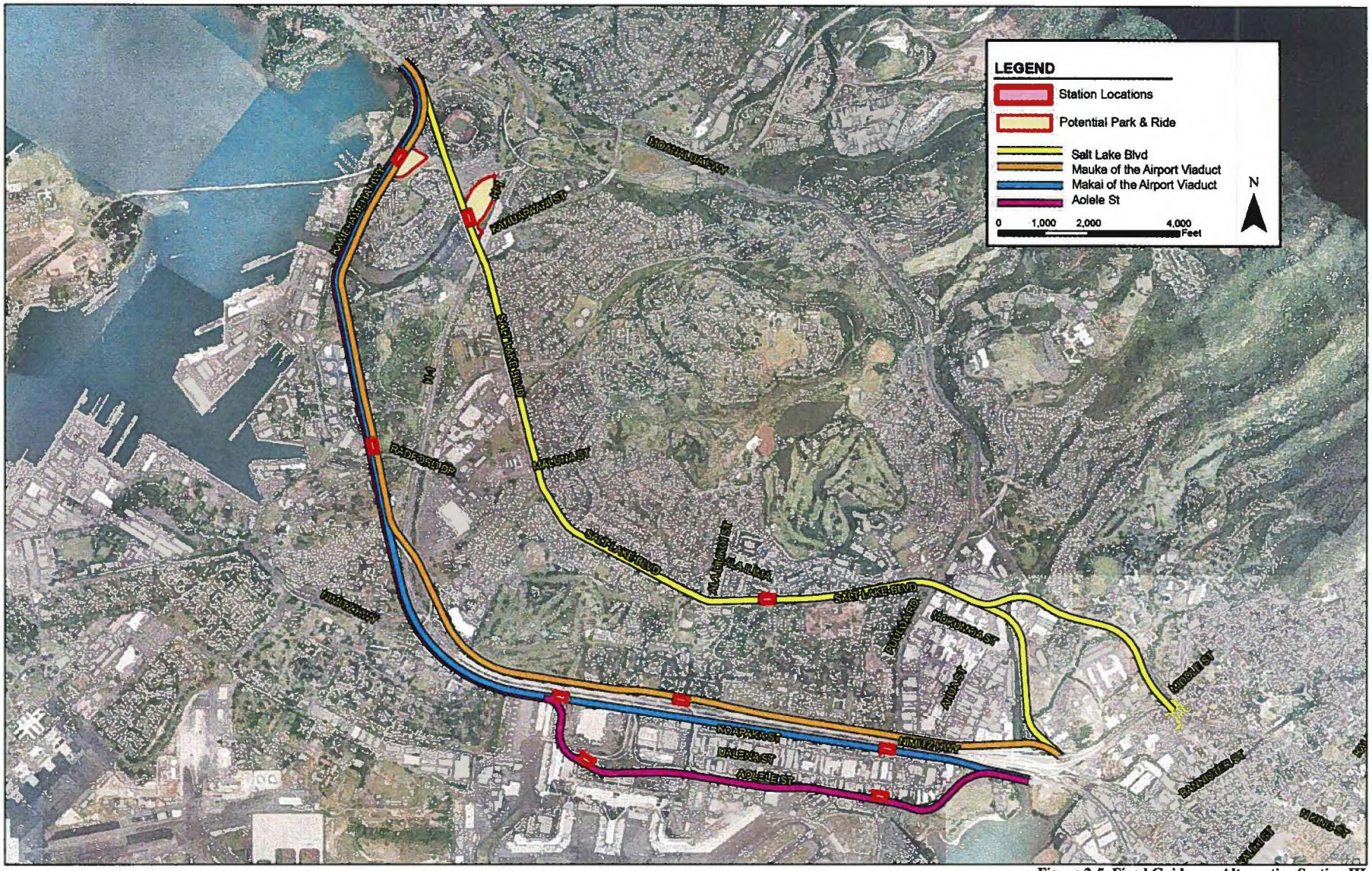


Figure 2-5. Fixed Guideway Alternative Section III

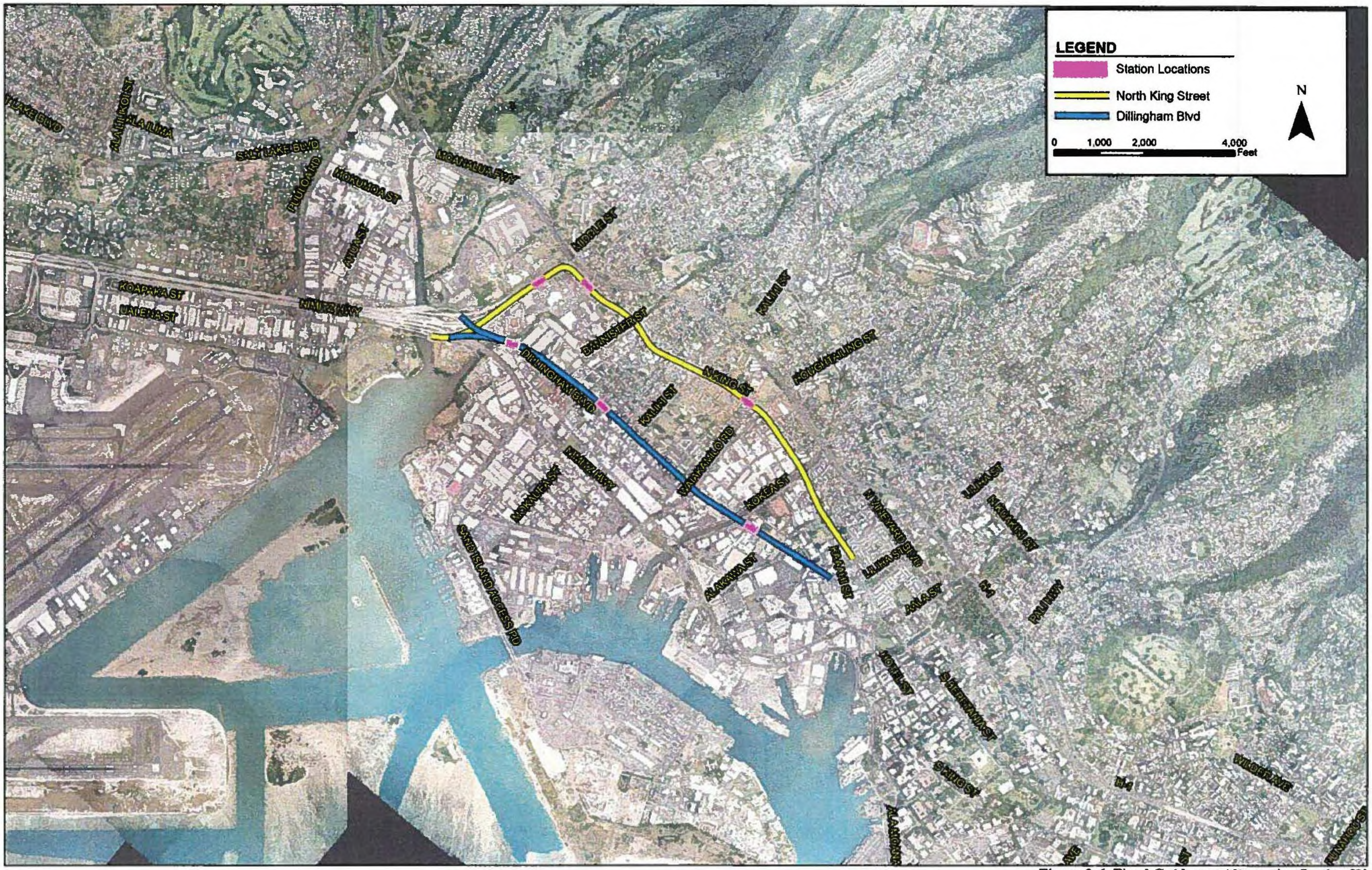


Figure 2-6. Fixed Guideway Alternative Section IV

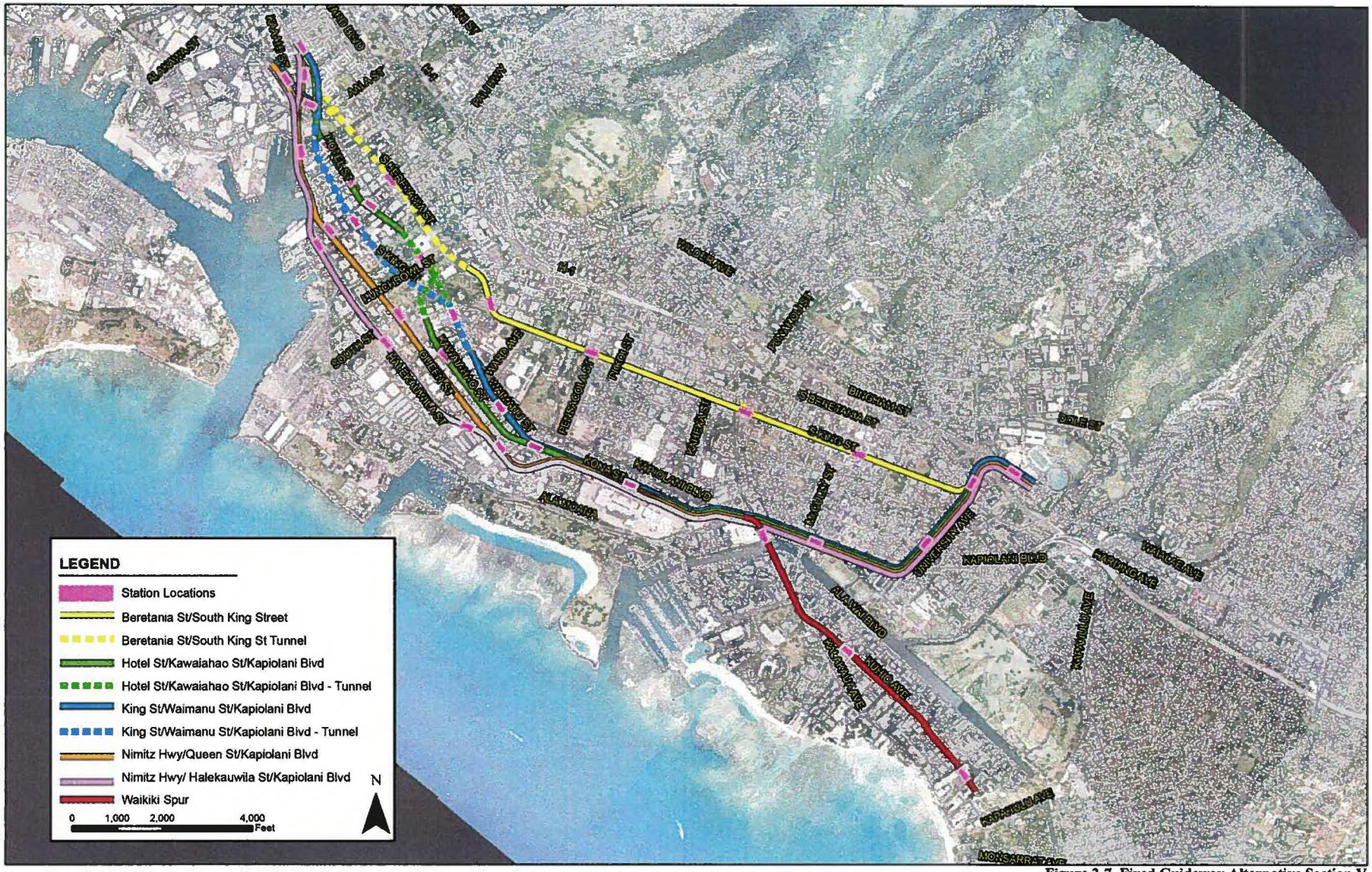


Figure 2-7. Fixed Guideway Alternative Section V

Table 2-3. Fixed Guideway Alternative Operating Assumptions

Time of Day[1]	System Headway[2]
4 a.m. to 6 a.m.	6 minutes
6 a.m. to 9 a.m.	3 minutes
9 a.m. to 3 p.m.	6 minutes
3 p.m. to 6 p.m.	3 minutes
6 p.m. to 8 p.m.	6 minutes
8 p.m. to 12 a.m.	10 minutes

[1]System is closed from 12 a.m. to 4 a.m.
[2]With Waikīkī Branch, branch-line headway to Waikīkī and UH Mānoa would be twice that of the main line.

A vehicle loading standard of one standee per 2.7 square feet of floor space has been used. The system is planned to operate with multicar or articulated trains approximately 175 to 200 feet in length, with each train able to carry a minimum of 300 passengers. - IS THIS CORRECT? This would provide a peak capacity of at least 6,000 passengers per hour per direction. The number of vehicles required to provide this service is listed in Table 2-1, assuming two vehicles per train. With the exception of the Hotel Street alignment, the system would be expandable to longer trains of up to 300 feet in the future to increase capacity by 50 percent. Also, the system could be operated with shorter headways to increase peak capacity.

Optimum Fixed Guideway Alignment

Each of the Fixed Guideway alignment options discussed above is evaluated in the following chapters of this report in relation to transportation benefits, environmental and social consequences, and costs. The findings within each of these topics are synthesized at the beginning of Chapter 6 (Comparison of Alternatives) to determine the optimal combination of alignments. The comparison results in an optimal alignment of Saratoga Avenue/North-South Road to Farrington Highway/Kamehameha Highway to Aolele Street to Dillingham Boulevard to Nimitz Highway/Halekauwila Street/Kapi'olani Boulevard, which is the Kalaeloa - Airport - Dillingham - Halekauwila combination Figure 2-8.

Twenty-mile Alignment

To provide an alternative with lower cost than the Full-corridor Alignments, a 20-mile Alignment was identified for evaluation. The 20-mile Alignment provides a substantial benefit to users with a lower capital cost.

Several portions of the corridor could be selected within the range of sections and alignments considered for the Fixed Guideway Alternative; however, the optimum shortened alignment should be able to provide substantial benefit to transit users independent of the remainder of the system under long-range consideration. As indicated by the financial analysis presented in Chapter 5, there is a substantial level of uncertainty in development of a fixed guideway system for the entire length of the study corridor (Kapolei to UH Mānoa) with known available funds from tax sources, combined with a

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